Association of socioeconomic factors and academic performance on medical students entering primary care specialties

Shilpa Kolachina[1], Amy Wozniak[2], Emanuel Eguia[3], Elizabeth Miller[1], Mary Eguia[4]

[1]Loyola University Chicago Stritch School of Medicine, Maywood, IL; [2]LUMC Center for Translational Research and Education; [3]LUMC Department of Surgery; [4]LUMC Department of Family Medicine

Introduction

It has been increasingly established that there is a current shortage of primary care physicians (PCPs) in the United States with a need for approximately 50,000 additional PCPs to meet population needs by the year 2025.[1] In fact, data collected from the AAMC Graduation Questionnaire longitudinally across many US medical schools demonstrate a decrease in proportion of students pursuing primary care specialties as well as obstetrics-gynecology. [2] Therefore, it is important to understand the socio-demographic profile of students entering primary care specialties and to determine whether various aspects of academic profile also play a role in entering primary care specialties. These associations can then be used by faculty mentors to better guide interested students towards the fields of family medicine, general pediatrics, general internal medicine, and combined internal medicine/pediatrics.

Factors that have been highly and consistently associated with primary care as a specialty choice in prior literature include: female gender, rural background, belonging to an underrepresented minority population, specifically African American or Hispanic, required family medicine clerkship during third year of medical school, and desire to work with underserved populations. [3]

Objectives

In this study, we specifically aim to:

Identify any statistically significant associations of sociodemographic factors and academic performance on students entering primary care specialties, specifically utilizing the Loyola University Chicago Stritch School of Medicine (LUC-SSOM) institutional data from medical students that graduated between 2013-2019. We hope to determine the latter through the following goals:

Identify associations between sociodemographic factors including age, gender, race, marital status, number of children, family income, and disadvantaged/economically disadvantaged status on medical school application on entering primary care specialties.

Identify associations between academic performance on LUC- SSOM pre-clinical coursework final numerical grades and entering primary care specialties.

Demonstrate any associations between overall LUC-SSOM clerkship scores and entering primary care specialties

Determine whether certain specialties are associated with a higher USMLE Step 1 score(s) or a difference in failure rate of USMLE Step 1, especially considering the new pass or fail change in scoring methodology.

Results

Figure 1: Multivariable Odds Ratios for LUC-SSOM student characteristics.
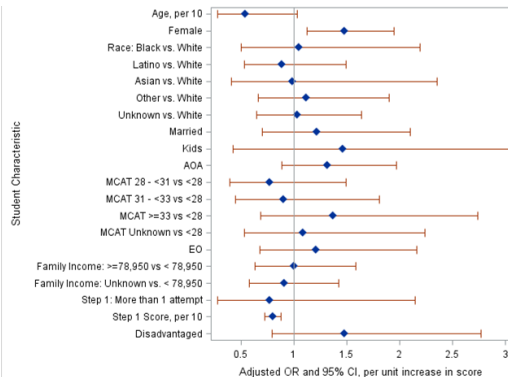
AOA: Alpha Omega Alpha Honor Medical Society; EO: The AAMC SES EO indicator classifies applicants into five ordered groups (EO-1 through EO-5) based on four aggregated categories of parental education and two aggregated categories of occupation[4];
Disadvantaged: option to self identify as disadvantaged in the American Medical College Application Service (AMCAS) primary application [5]

After adjusting for all covariates, it was found that being female was associated with 48.3% increased odds of entering a primary care specialty (OR 1.483, 95% CI 1.129, 1.947, p = 0.00463) On the other hand, each unit increase in Step 1 score was associated with 2.2% decreased odds of entering a primary care specialty (OR 0.978, 95% CI 0.969, 0.988, p=0.00001). However, it was found that there were no statistically significant associations between USMLE Step 1 failure rates and entering primary care or non-primary care specialties.

Figure 2: Adjusted Odds Ratios for LUC-SSOM Pre-clinical and Clinical Coursework

MCBG: Molecular, Cell Biology, Genetics; SHB: Structure of the Human Body; FHB: Function of the Human Body; HD: Host Defense; MHD: Mechanisms of Human Disease; *All Courses below Pharmacy II are Clinical Courses

After adjusting for the covariates, it was found that there were no statistically significant associations between increasing pre-clinical course scores and entering primary care or non-primary specialties. As depicted in *Figure 2*, it was found that each unit increase on the NBME Surgery shelf exam was associated with a 2.1% decreased odds of entering a primary care specialty. (OR 0.979, CI 0.962, 0.996, p=0.017). On the other hand, each unit increase on the Medicine, Pediatrics, Psychiatry, and ICU clerkship exams was associated with a 4.1%, 5.6%, 5.3%, and 3.6% increased odds of entering a primary specialty, respectively. (OR 1.041 CI 1.005, 1.078, p=0.025), (OR 1.056, CI 1.025, 1.088, p=0.000), (OR 1.053, CI 1.007, 1.102, p=0.024), (OR 1.036, CI 1.014, 1.059, p=0.002)
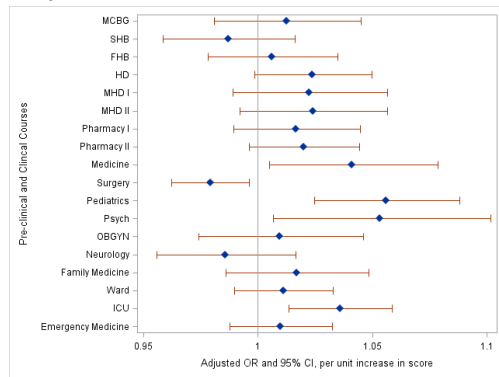
Methods

We conducted a retrospective cohort study comparing students that entered primary care vs. other specialties. Our sample consisted of institutional data from Loyola University Chicago Stritch School of Medicine (LUC- SSOM) medical students graduating between 2013-2019; data was obtained from the Health Sciences Division Clinical Research Office A total of 993 alumni were included in the cohort. All students that had successfully matched into a specialty were included in the analysis. **Primary care specialties were defined as the fields of Internal Medicine, Pediatrics, Family Medicine, and Internal Medicine/Pediatrics.** All other specialties were categorized in a separate group, labeled non-primary care. Multivariable odds ratios in *Figure 1* were estimated using a logistic regression model with entering primary care vs. non-primary care specialties as the outcome. All risk factors included in the vertical column were the covariates. Adjusted odds ratios in *Figure 2* were calculated using a logistic regression model with entering primary care vs. non-primary care specialties as the outcome and score(s) as main predictor of interest while adjusting for all covariates in *Figure 1*.

Conclusion

Apart from the lower USMLE Step 1 scores that were found to be inversely associated with entering a primary care specialty, this study highlights that students entering PC specialties perform at the same level or even higher on certain clinical clerkship exams than students entering non-PC specialties at LUC-SSOM.

The Association of American Medical Colleges Center for Workforce Studies conducted a cross-sectional survey study in 2010; it was found that fourth-year medical students attending a medical school known to speak unfavorably about primary care were 40% less likely to enter into a primary care specialty.[6] This highlights the importance of how medical school culture plays a role in influencing students' decisions.[6] These trends highlight that there are very minimal differences in pre-clinical and clinical academic performance between students entering primary care and non-primary care specialties at LUC-SSOM.

One limitation of our study is that we included all students that matched into internal medicine, pediatrics, and internal medicine/pediatrics into the the primary care pool; several of these students may have gone on to subspecialize.

References

[1] Petterson, S. M., Liaw, W. R., Phillips, R. L., Rabin, D. L., Meyers, D. S., & Bazemore, A. W. (2012). Projecting US Primary Care Physician Workforce Needs: 2010-2025. *The Annals of Family Medicine*, 10(6), 503–509. doi: 10.1370/afm.1431
[2] Jeffe, D. B., Andriole, D. A., Hageman, H. L., & Whelan, A. J. (2007). The Changing Paradigm of Contemporary U.S. Allopathic Medical School Graduates' Career Paths: Analysis of the 1997-2004 National AAMC Graduation Questionnaire Database. *Academic Medicine*, 82(9), 888–894. doi: 10.1097/acm.0b013e31812f797e
[3] Bennett, K. L., & Phillips, J. P. (2010). Finding, Recruiting, and Sustaining the Future Primary Care Physician Workforce: A New Theoretical Model of Specialty Choice Process. *Academic Medicine*, 85. doi: 10.1097/acm.0b013e3181ed4bae
[4] Grbic D, Jones DJ, Case ST. The Role of Socioeconomic Status in Medical School Admissions: Validation of a Socioeconomic Indicator for Use in Medical School Admissions. Acad Med. 2015 Jul;90(7):953-60. doi: 10.1097/ACM.0000000000000653. PMID: 25629949.
[5] Socioeconomic Status Disadvantaged Indicator. (n.d.). Retrieved September 23, 2020, from https://www.aamc.org/services/amcas-for-institutions/processing-tools/resources-reports/socioeconomic-status-disadvantaged-indicator?fbclid=IwAR0gUYFGTLlGBqXtUWPzbsJsKqSkgrPdJPr35rd8mQu-wWsih0b_Wm2FRTs
[6] Erikson, Clese E., MPAP; Danish, Sana, MPP; Jones, Karen C., MApStat; Sandberg, Shana F., PhD; Carle, Adam C., PhD The Role of Medical School Culture in Primary Care Career Choice, Academic Medicine: December 2013 - Volume 88 - Issue 12 - p 1919-1926 doi: 10.1097/ACM.0000000000000038

Acknowledgments